COMMUNICATION: A WORD WITH PRESIDENT COULTER

EDITOR OF THE SCHOOL REVIEW:

Allow me to enter a serious protest against a wholesale statemade by Professor Coulter on the first page of his article in your February number. He says that physical geography, astronomy, geology and physiology "in the very nature of things cannot be handled in secondary schools other than as purely informational subjects. As such they contain no scientific training whatever, and such claim should not be made for them."

Geology as a specialized subject is better handled in colleges than in schools, but many of its simpler principles form an essential part of physiography, which is very properly a high school subject. As to physiology, I cannot speak. As to astronomy and physical geography, including meteorology, my opinion stands precisely opposite to Professor Coulter's. It is very likely true that in most secondary schools of today, these three subjects are treated in a purely informational manner; so are all other subjects, for that matter. But all three of them can be treated so as to yield abundant and excellent scientific training, and in certain secondary schools that I know of a good beginning is already made in treating some of these subject scientifically.

Taking astronomy first, it is safe to say that simple observations, within reach of scholars in grammar and high schools, may lead them to a thoroughly scientific, though elementary, understanding of the movements, distances, and sizes of various heavenly bodies. Training in observation, generalization, inference, deduction, and verification would all be afforded in this work; and the really marvelous nature of apparently commonplace things would be disclosed. Geometry would be carried from the dusty blackboard to its magnificent applications in the sky. The discipline thus gained would be valuable by very reason of its contrast with that given by all other studies. It is true that the ordinary use of current text-books prevents almost entirely the kind of work that I have in mind; and it is as true

here as in physics, chemistry, zoölogy and botany, that the teacher must be thoroughly competent to deal with the subject. When the competent teacher of elementary, practical astronomy is forthcoming, the text-books will be largely displaced by observational "laboratory work"—even though the laboratory has no ceiling. At the end of a course of this kind, the scholars will not have so much information as if they had studied what is properly called a good text-book, but they will have a sound and appreciative knowledge of the essential quality of astronomy; and on this they can build as much more knowledge as they wish. The kind of astronomy that I wish to see taught might be called "astronomy at sight." I am not willing to admit for a moment that "in the very nature of things" this grand subject must be taught to the majority of our people in such a way as to give them "no scientific training whatever."

Taking meteorology next, there is hardly a school subject that is more abused today, but I have hopes of its gradual improvement. Here is a subject in which every school is well supplied with facts to work on, even if they are outdoor facts. The supply need not be limited to local facts, but may be greatly extended by using weather maps and climatic charts, now generally available. If objection is made that these do not supply first-hand facts, it is only necessary to refer to the use that has been made of them by Loomis, Ferrel, and many others, whose work is of a highly scientific nature. The discussion of local and general observations calls for the most interesting applications of the principles of physics; an indoor laboratory subject is thus given its proper outdoor extension and application. My colleague, Mr. R. DeC. Ward, has this winter given brief courses of ten lectures each to the teachers in four towns near Boston, in which he has laid out a thoroughly scientific plan of work in elementary meteorology for grammar schools. Jointly with him, I have planned a course of more advanced grade for high schools. Both these courses are educative in a high degree. In regard to meteorology, therefore, as far as Professor Coulter has included it under physical geography, I

fear that he has spoken more from acquaintance with what is ordinarily done in the schools, than from a consideration of what can be done.

Finally, physical geography—or physiography, as it is coming to be called—may be made thoroughly scientific in its methods and highly educative in its results. It may be presented in secondary schools so as to lead to demonstrable knowledge; it may develop ability to think logically; it may cultivate real mental power. It may be based on observation; for although the opportunity for observation in elementary physiography is at present seldom utilized even by country schools, the reason for this neglect is chiefly that the teachers themselves do not know what there is to observe. Photographs and lantern slides may almost replace field work for city schools, particularly if a little flavor of outdoor observation can be introduced once in a while, and if the photographs begin with local views, well chosen. Good maps, which are becoming more easily obtainable every year, afford basis for description, generalization, inference, and other educative exercises. It is unhappily true that much of what can be done is not done now; but it is happily true that geographers need by no means despair of ever being able to teach really scientific geography. The reports that I have had this winter from a number of the teachers who attended my course in physiography last summer are most encouraging as to the possibility of replacing empirical, descriptive geography by rational physiography, even with young scholars. Physiography, universally recognized as of great value on its informational side, may certainly be delivered from the reproach that Professor Coulter puts on it.

It is not surprising that a biologist, plentifully occupied with his own line of studies, should not be aware of the advances advocated in the methods of teaching the inorganic branches of natural science; but it is to be regretted that he should so positively assert his views of the narrow educational limitations of these other branches at a time when many are laboring for their extension.

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